

**TORNADOES OVER TEXAS: A STUDY OF WACO AND  
SAN ANGELO IN DISASTER AND ITS IMPACT UPON THE  
STUDY OF DISASTER**

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**INTRODUCTION**

Harry Estill Moore came to the study of disaster late in his life and academic career. Yet, in only a few years he made an impact upon the field which had lasted some thirty years and showed signs of continuing to be influential. It is the purpose of this article to review and discuss this influence especially as it is expressed in his book, *Tornadoes Over Texas: A Study of Waco and San Angelo In Disaster*, which was published in 1958 by the University of Texas Press.

TOT is a report of several years of research carried out during the 1950's in the Sociology Department at the University of Texas by The "Waco-San Angelo Disaster Study" project directed by Harry E. Moore. It was established to study the consequences of the tornadoes which hit Waco and San Angelo on May 11, 1953. TOT, one of the publications of the project, is broad in scope and includes topics such as the tornadoes as events, the damage they caused, the financial and other costs, legal and governmental problems, age and race differences, the treatment of the disasters in the media, and detailed case study materials.

**ORIGINS AND EVOLUTION OF THE STUDY**

At the time of the Waco-San Angelo tornadoes of 1953, Harry E. Moore was a well-established sociologist past mid career in the Department of Sociology at the University of Texas. He was born in 1897 in Bethany, Louisiana, served in the United States Army during World War



I, worked as a newspaper reporter, and was a student at the University of Texas from which he graduated in 1927 with a major in journalism. After graduation he worked for newspapers for several years, then returned to the University of Texas for graduate study in sociology. He finished his MA thesis in 1932 (Moore 1932). In 1937, he received his Ph.D. in sociology from the University of North Carolina and returned to the University of Texas as Assistant Professor. He was promoted to Associate Professor in 1945 and to Professor in 1955. He died in 1966 at the age of 69.

Before developing his interest in disaster, Moore had clearly defined research, teaching, and writing interests. He taught courses in American regionalism, communication, the history of sociology, public opinion, race relations, and sociological theory. He published on American Regionalism (Odum and Moore 1938), an introductory text (Groves and Moore 1940), on public opinion and communication (Moore 1945; 1950; 1951) on communities and urbanism (Rosenquist and Moore 1932; Moore 1955), the adjustment of veterans after World War II (Moore 1949; Moore and Moore 1945), and methodology (Moore 1954). Also, he was contributing editor to Fairchild's *Dictionary of Sociology* (1944), a contributor to the *New Collier's Encyclopedia of 1950*, and editor of the *Southwestern Social Science Quarterly*. Throughout his career he engaged in considerable collaboration in both research and service activities with his wife, Bernice Milburn Moore who had also earned a Ph.D. in sociology at the University of North Carolina (Gettys 1958).

At the time, May 11, 1953, the tornadoes hit Waco and San Angelo there was a growing interest in the study of disaster. These developments are discussed in other articles in this issue of the *International Journal of Mass Emergencies and Disasters*. This interest was expressed through the development of a small literature and some financial support from foundations and various government agencies. The Texas tornadoes attracted considerable notice among those with this interest and they seemed to be worth research attention. Some of these agencies approached the Department of Sociology at the University of Texas about the possibility of conducting research on the two disasters and before the summer was over, the study had begun under the direction of Harry E. Moore. It is not precisely clear just how Moore became director of the project. Gettys, in his history of the sociology department comments

that "...perhaps more from a peculiar set of circumstances than anything else, the study of disaster has occupied much of his research activity in recent years" (1958, p. 15). Among graduate students of the time, there was a rumor that the directorship fell to Moore because he was not present to defend himself at the department meeting where the possibility of doing the research was discussed. In any case, he did become director and began a new academic interest to which he devoted a great part of the remainder of his professional life.

At the time the Waco-San Angelo Disaster Study began, funding for social science research was rare as compared with the situation today. However, the project did receive financial support which made it possible to develop a research staff and provide support facilities. By today's standards, that support was modest. In his "Introduction and Acknowledgments" to TOT, Moore mentions the receipt of a "token" grant of \$500 from the Committee on Disaster Studies of the National Academy of Sciences-National Research Council and, for exploratory work, \$500 from the Hogg Foundation for Mental Health at the University of Texas. Later a grant of \$5,000 came from the Federal Civil Defense Administration, and The Institute of Public Affairs at The University of Texas contributed about \$2,700. Additional funds came from time to time from the Committee on Disaster Research and the Hogg Foundation. Even though the support that came to the project was modest, there were enough sponsors and regulations to cause considerable frustration and difficulty (Moore 1958b, p. xviii).

The research project which led to the publication of TOT went through a series of stages. First was the initial decision, described above, on the part of Moore and the Department of Sociology to conduct and support the study.

Next came the assembling of a research staff. Fred R. Crawford became Field Director of the project. Graduate students from economics, psychology, and sociology joined the project and a clerical staff was formed (Moore, 1958b, pp. xxii-xxiii).

The end of the first year of research on the project was marked with the preparation of "The First Annual Report On the Waco-San Angelo Study" (Moore and Crawford 1954). It had a discussion of the disaster settings in Waco and San Angelo which covered the warning process, the death, injury, and physical destruction caused by the tornadoes, the



communication and rescue situation, civil defense plans, and the reconstruction process. There was also a discussion of the donations given to help the victims, and the application of the new Public Law 875 which provided for aid from the Federal Government. The report also contained a review of the economic effects of the tornadoes and a section on the event's impact upon families.

The next year the "Waco-San Angelo Study: Report of Second Year's Work" (Moore and Crawford 1955) was released. It reviewed the reactions of people in San Angelo to a second severe storm which came almost exactly a year after the first. Mental health implications of the disasters were discussed. Attention was given to the impact of the tornadoes upon family types, the problems of the aged, and differences between black and white families. Changes in employment patterns after the tornadoes, the use of building permits as a measure of recovery, and the working of commercial agencies in the recovery process were treated. The activities of organized religious groups and mass communication agencies in disaster were reviewed. In addition, there was a discussion of preparation as it related to the reaction of the two city governments.

The material presented in these two reports formed the primary basis for TOT. Some material which did not appear in the two reports was added, but essentially TOT is an edited and rewritten version of them.

### THE BOOK CONTENTS

Since the scientific study of disaster was at an early stage, the TOT as it emerged had a "grounded" character (Glazer and Strauss 1967). Moore (1958b, p. xviii) wrote that:

It might be assumed that, considering the lengthy prior discussion and formulation of plans, the actual research would have been sharply focused. But the project plan as finally developed was inclusive, rather than delimited. Without any sure guide or firm agreement about what it was feasible to study, we decided that the initial work should be descriptive rather than incisive, believing that as exploration progressed, more specific focuses would be selected... As a result, much of what was obtained is ex-

cellent descriptive material that does not lend itself to rigorous analysis of a "research" nature.

Various kinds of data were collected through a number of different means and techniques. These included: tape recorded interviews and discussions with government and other officials, documents and files from many agencies, information from newspapers and other publications, interview schedules, and intensive indepth interviews.

The methodology employed in TOT received some criticism (Barton 1970, p. 60). However, some of the reviewers of the book, to be discussed below, suggest that Moore need not have been so apologetic. He did perceive limitations to the study which he described as "primarily descriptive and designed to give, in semi-popular style, an understanding of disaster and its consequences. This, of course, sets it apart from the more technical presentations of experimental or analytic testing of hypothesis commonly presented in learned journals" (1958b, p. xix).

TOT has a Foreword by Logan Wilson, President of the University of Texas at the time, and Robert L. Sutherland, Director of the Hogg Foundation for Mental Health, a Preface by Wayne H. Holtzman, an Introduction and Acknowledgments, and fifteen chapters. A summary of the chapters follows.

### Chapter 1: "Cities in Crisis"

This provides the context for the study with a description of the tornadoes and their consequences. On both May 10th and May 11th, 1953 the weather bureau issued warnings of the possibility of storms and tornadoes. There were early sightings of the approaching tornadoes in Waco and San Angelo. In Waco the warnings had little influence, while in San Angelo the warnings, especially those associated with the tracking of the tornado outside town by patrol officers, are believed to have reduced casualties.

The Waco tornado path was about five miles long. There was considerable variation in the destruction caused by the tornado because it bounced. It was most destructive in the central business district, but there was considerable damage in residential areas. In Waco 114 people were killed, 145 suffered serious injuries, and 952 were lightly injured. It was



estimated that 2,000 families had some sort of loss, that 2,000 automobiles were damaged or destroyed, 150 homes were destroyed, 250 homes seriously damaged, and 480 homes required some repair. In the central business district, 196 structures were demolished or not repairable and 396 were declared unsafe. The damage was estimated to have totaled about \$51 million.

Immediately after the tornado, there was considerable confusion. Uncoordinated and informal rescue work started, but at first there was disorganization on the part of officials, official agencies, and unorganized rescue teams. Later, coordinated and effective activity emerged. However, Civil Defense plans did not work well. Help came from a nearby military base state and local agencies, and individual donors. The available medical facilities were adequate. There were problems with a convergence of supplies and sightseers. Within a week of the tornado, rehabilitation and reconstruction activity had started.

In San Angelo, the tornado traveled for about three miles through a suburban residential area called Lake View. It left eleven dead and 66 with serious injuries. Property damage included 320 homes destroyed, 111 homes requiring major repairs, 88 needing less extensive repair and 1700 persons were left homeless. Other damage included 19 small businesses which were wrecked, about 150 automobiles destroyed or damaged, and \$200,000 in damage to a local school building. The total cost in terms of material damage was estimated to be \$3,123,000.

Rescue operations began immediately after the tornado passed through. There was much less confusion than in Waco as a consequence, it was believed of effective response to the warnings, recent Civil Defense and disaster drills (especially in the local school), and no breakdown in the communication or governmental system. Help came from local National Guard forces, personnel from a nearby Air Force base, and other state and local agencies. The local medical facilities were adequate. As in Waco there was a convergence problem with sightseers. Rehabilitation and reconstruction work started within a week after the disaster.

## Chapter 2: "Tornadoes Cost Money"

This chapter is almost entirely devoted to the situation in Waco which suffered the greatest damage. The losses became associated with an old

conflict between business leaders in Waco who wanted slow or little economic growth and others who desired more "progressive" policies. Moore (1958b, pp. 33-34) described this situation in one of the most quoted passages in TOT as follows:

For a short time the ancient fault line that had for so long divided the citizens of Waco was cemented by overwhelming and unifying emotions of fear, anxiety, sympathy, and fellowship. However, the division soon reappeared in complaints that the military rescue workers did as much damage as had the storm by pulling down sound walls in their haste to search the rubble for victims, that the attempts of the city administration to enforce the building code were detrimental and unfair to those who suffered damage to their property, that the new tax-evaluation study which had been proposed, and resisted for several years was discriminatory, and in other complaints. From the other side came charges that some of the businesses and property-owners in the disaster area were sabotaging efforts to create a more modern community out of the chaos brought by the tornado by repairing the damaged buildings as cheaply as possible in order to re-create the same type of low-rent business area that existed before the storm. No regard was given, it was sometimes said, to plans developed for replacing the old with a well-planned business area.

Most of the cost and work of rescue and debris removal was borne by various government agencies. The utilities, gas, electric, etc., companies were the most efficient in the restoration of service. They had their own disaster plans and considerable experience with smaller disruptions such as hailstorms, high winds, and flooding.

Restoration of commercial property and activity and residences began within a week after the tornado. Most of the cost was paid by private individuals and private enterprise. However, almost ten million dollars came to Waco from outside the community to aid in its restoration.

The employment rate, numbers of business establishments, retail sales and building permits were used to study the extent of economic dislocation, recovery, and rehabilitation. Employment fell during May and



Following the tornado. The employment level returned to normal in July, then declined slightly until December when it began to rise again. Small retail and wholesale businesses suffered more than large ones. About 45 of the smaller establishments did not reopen after the tornado. Retail sales stores recovered more quickly than did wholesale establishments. By the end of the year both were back to pre-tornado levels. There was a small decline in retail sales in May, but the tornado seemed to have had little influence on this area of economic life. The building permits, which were issued to rebuild or restore damaged structures reached a peak in June. By December most reconstruction requiring a building permit had been completed.

The chapter concludes with a thoughtful discussion of the difficulties involved in the use of these measures and the suggestion that other indices might be more appropriate.

### Chapter 3: "Legal and Governmental Problems"

The disasters involved the first application of Public Law 875 under the administration of the Federal Civil Defense Administration. There was considerable confusion and controversy about application procedures, which aspects of community life qualified for funds, what were 'reasonable' local contributions for matching purposes, and related matters. There was also, especially in San Angelo, some reluctance on the part of local officials to accept Federal aid.

The State of Texas provided aid primarily in the form of trained personnel, equipment, legal and administrative assistance, and the passage of legislation permitting the acceptance of funds from the Federal Government. The State's cost was estimated to have been less than \$100,000.

Local government had to cope with the concerns of businessmen who wanted to return to their establishments to protect their goods and assess their losses. At the same time serious questions emerged about unsafe structures and who might be liable should they fall and cause damage and injury later. Problems developed over removal of the dead and whether or not it was legal to dismember human remains in order to extract them from wreckage. There was controversy too over the ownership and disposal of the salvageable material which had been taken to the city dump. Little looting was reported.

### Chapter 4: "Families in Distress"

Area probability sample interview data were collected from 28 families in Waco and 150 families in San Angelo who were still living in the tornado paths. The interview schedule had 100 items. Information was collected on background variables, pre and post disaster housing, the storm's effects on health, economic consequences, attitudes about the disaster, and cultural factors related to rehabilitation.

Families in the stricken area in San Angelo had more property loss and a higher percentage of physical injury than those in Waco. San Angelo victims had higher rates of unemployment than those in Waco, perhaps because more of them took time off to rebuild their homes. In both cities victims did a great deal of their own rebuilding and the greatest source of funds was their own savings. Self reliance was important as 76% of the Waco families and 28% of the San Angelo families did not receive any aid from outside their families. Those who did receive other aid got it from a large number of sources including agencies such as the Red Cross, Salvation Army, local disaster funds, relatives, and friends. The respondents' efficiency ratings of the relief groups showed that the military, state and local police, Salvation Army, and church groups fell in the top half while other agencies and relief funds, non military government agencies, and police were in the bottom half. There was little change in religious activity among the victims after the tornadoes. However, the churches and clergymen played an active role through pastoral calls, counseling, the receiving and dispersing of items like food and clothing, and providing relief stations. In Waco, two-thirds, and in San Angelo, about one-half of the respondents felt that they were about as well off as before the storms. Emotional stress, as a result of the storms, was present in 23% of the Waco families and 73% of the San Angelo families. But there was considerable optimism as 66% of the Waco families and 71% of the San Angelo families expected their cities would be better off as a consequence of the storms.

### Chapter 5: "The Future"



that did not move. The mover families also had greater economic loss, additional expenses related to the move itself, more interruption of employment, less insurance protection (somewhat offset by aid from relief agencies), greater debt caused by the storms, and more injuries from the tornadoes than non movers. A few mover families moved three or four times, but for most there were two; first to the emergency location then back to the original place. This was especially true of owner families who tried to find an emergency residence as close as possible to the original location. These tended to be in densely populated areas close to the original location and similar in facilities and value. The permanent residences of families who did not return to the original site tended to be better than the one they left, and rebuilt homes tended to have a higher value than the original. Greater proportions of the movers than non movers believed that their neighborhood and city would be better off in the future, but had more emotional disturbances and fear of the weather.

#### Chapter 6: "The Aged"

The problems faced by older persons as a consequence of the tornadoes are described in this chapter. For comparative purposes the families were divided into five types: Type I, the conjugal family; Type II, three generations of related persons; Type III, the grandparent-generation members plus either a parent or grandchild; Type IV, aged persons, mostly married couples or sometimes an aged parent and middle aged or aged child; and Type V, a single aged person living alone and maintaining a household.

Those classified as Type II families suffered more loss than others while those in Type I families suffered least and were better able to do their own reconstruction. Overall, families in which there were older persons did not recover as quickly as those without. But those in Type V families reported the lowest rate of emotional stress and fear of weather.

#### Chapter 7: "Race Differences"

No black people were directly affected by the storm in San Angelo, while in Waco the tornado went through a black residential area. In

Waco, 18.7% of the families in the study were black. The black families were slightly larger, more likely to be broken by death, divorce, and desertion and twice as likely to have had an ill person in the family at the time of the tornado than white families. They had 50% less income, one half less had pensions, and their residences had less value than white families. They were hit harder by the tornado in that, while none were killed, they suffered 120 injuries as opposed to 4% for the white families, had a higher incidence of illness and fear of the weather after the tornado, were more likely to have lost employment, had more damage to their residences and had a smaller proportion who moved in with friends. A larger proportion of black families received aid than did white families, but they received a smaller average amount of emergency aid and a higher average amount for repairing and rebuilding their homes. Black attitudes were more favorable toward the Red Cross, the local disaster fund, and other local social agencies, and more negative to city, state, and federal agencies.

#### Chapter 8: "Donors and Donations"

Supplies of all kinds, often more than could be conveniently handled, came to Waco and San Angelo. Many people contributed money. However, it was difficult to discover how much or be entirely sure of the use made of all of it since careful records were not kept and those giving money sent it to many different agencies and individuals.

Donations were divided into three groups: (1) personal or individual (2) collective from formal and informal groups, and (3) agencies, (the contributions of organizations as distinguished from their members). Individual contributions were the smallest and most came from Texas. They came most quickly and dropped off rapidly. The donations contributed by collectivities were highest. They were slower in getting started and slower to drop off than the personal contributions. Several newspapers and radio stations in other cities led campaigns to collect relief funds. The agency donations were also slower to begin and slower to drop off than the personal contributions. The amount contributed by agencies was second to that given to collectivities.

In both Waco and San Angelo, disbursing committees of businessmen were formed to allocate the funds. These committees



worked with established relief agencies. Only a small fraction of those making contributions placed any restrictions on the use of their gifts. The donations were allocated to such things as emergency subsistence, food, clothing, maintenance, schools, local taxes, building and repair, medical and nursing service, and the restoration of businesses.

Considerable hostility to the Red Cross was discovered. The Red Cross may have oversold itself as a disaster relief agency leading victims to have too high expectations of it. And it may have been too military and authoritarian and not "folksy" enough. Perhaps too, the Red Cross exercised or attempted to exercise too much control and operated with a strict adherence to policy which led to resentment on the part of local people and agencies. Many noted that the Red Cross, in the immediate emergency period was generous and open with supplies but that later it required detailed demonstration of need before it, would help with long term rehabilitation. Moore (1958b, pp. 179-180) commented that "all the while the Red Cross worker in her crisp uniform is filling in forms as she asks questions. And gradually the uniformed worker is transmitted from Great Mother to Wicked Witch, and is cursed accordingly."

### Chapter 9: "Channels of Contact"

Damage to communication systems was worse in Waco than in San Angelo. In Waco the authorities believed that their two greatest problems were lack of communication and traffic control. Runners transmitted messages for about three hours after the tornado in Waco. Around midnight officials in Waco established a communication and control system. Shortly after the tornado some, telephone service was restored through use of emergency generators and a mobile telephone car which served as a communication center. When the radio stations returned to operation, telephone calls were relayed to them and they, in turn, announced requests for supplies, etc. to the public. Telephone personnel came from near by cities and worked in Waco and service was almost completely restored in one week. Telephone service in San Angelo was not so disrupted because the tornado did not strike the central business district. As a result of prior warning, work crews were ready to respond.

The telegraph system in Waco lost its usual power for four days and used morse circuits and generators instead, and taxi service and U.S. Mail Special Delivery to deliver telegrams. On the day after the tornado almost 15,000 telegrams were delivered; the normal load was about 1,000. In San Angelo the number of telegrams was only 20% above normal and the local office closed at midnight.

In Waco amateur (ham) radio operators set up a broadcasting unit at City Hall within an hour after the tornado. The Military Affiliate Radio System at Connally Air Force Base transmitted messages about the tornado to concerned service people over the world. After the commercial radio stations returned to the air, they transmitted personal messages to relieve anxiety and aired requests for supplies, unusual equipment, and other items. They also appealed to drivers to stay away because of serious traffic control problems caused by sightseers.

In both cities there was a great increase in the volume of mail after the tornadoes, especially in regard to special delivery items. But regular service was not interrupted except in the central business district of Waco.

### Chapter 10: "The Newspaper Tells the Story"

As a consequence of limitations of time and space only the *Waco Times Herald* was analyzed for the study. The newspaper content was examined from May 1, 1953 to June 1, 1954, and divided into news, photographs, and advertisements, both disaster and non-disaster material, local and non-local. The ranking of the content, from greatest to least over the period studied showed: 1. aid received; 2. human interest; 3. miscellaneous; 4. governmental activities; 5. injury and death; 6. public information; 7. plans for rebuilding; 8. business information; 9. physical destruction; 10. physical rebuilding; 11. rescue activities; 12. salvage and cleanup; and 13. religious activities. It had been expected that the newspaper, in contrast to other media, would contain more information about planning, long term rehabilitation and debate. However, within three weeks the newspaper had almost returned to its normal coverage.



### Chapter 11: "Repeat Performance"

On June 7, 1954, thirteen months after the tornado, there was a very heavy hail, rain, and wind storm in the Lake View district of San Angelo. This chapter begins the part of the book devoted to the relationships between the tornado experience and reactions to the second storm. A second interview was conducted with 114 of the 150 families interviewed after the tornado. Several were given intensive focused interviews, to be discussed in more detail below, to gain a deeper understanding of their emotional reactions.

The subjects were "storm conscious" as indicated by the observations of the school authorities and others, the second interview schedule, and the fact that a third of the families had constructed storm cellars. At the time of the second storm only 28% said that they had no remaining disaster caused problems. While the city government and media treated the second storm as a minor event, those who experienced it tended to take it quite seriously. The repeat study revealed considerable emotional stress, among the victims, and the second storm appeared to have reinforced the emotional consequences of the first. Seventy-five percent of the respondents had no warning of the second storm. Their protective actions were not rationally planned and ranged from near panic to an apparent lack of fear. Most of the respondents, who had received considerable help after the first storm, were not willing to make a donation to the victims of the second storm, and 65% suggested that various social welfare agencies should help them instead. Asked why they thought Lake View had been hit a second time, the respondents answered: Lord's will or punishment (21%), in the pathway of the storm (77%), atom bombs (5%), fatalistic acceptance (4%), natural causes (16%), and no explanation (47%). Approximately a third of the respondents had changed their minds, almost two to one in a favorable direction, about the agencies active after the tornado and there was a shift in opinions toward more pessimism, about the future of the city and neighborhood.

### Chapter 12: "The Blow of the Wind"

This is the first of three chapters based on in-depth interviews conducted after the second storm in Lake View. Names of persons believed

to be suffering emotional stress as a consequence of the storms were collected from local informants. Twenty-two of these were interviewed by a team of six persons using tape recorders. The results of the 19 useable interviews are presented in a series of quotations taken from the tapes.

Martha Wolfenstein also made use of this material in her book *Disaster: A Psychological Essay* (1957). Both books contain many of the same quotations from the in-depth interviews. The Committee on Disaster studies of The National Academy of Sciences - National Research Council, which provided some of the funds for this part of the study, requested transcripts of the interviews so that they could be examined from a different theoretical viewpoint. Moore (1958b, p. 228) commented that:

Unfortunately, the Committee failed to consult with the director of the research project before approving the use of the interview material by Dr. Wolfenstein in her book. It was not until his own book was in press "that the director of the project was aware of the prior publication of this material.

The documents were returned after being used by Dr. Wolfenstein and are, of course, now available to any qualified researcher who may wish to use them.

It is deeply regretted that the customary prerogative of researcher to be the first to present his data in published form was contravened in this instance. The Committee has expressed its regret for embarrassment which may have been caused by this error.

The respondent's immediate reaction to the storm was to feel dazed and numb. This lasted for only a short time for most. There was considerable illness both physical and emotional, but the complaints were vague and poorly defined. Most common were upset stomachs, vomiting, and nervous feelings. They were reluctant to visit physicians especially when they had no obvious injury. They were slowly returning to normal and were optimistic, but expected the process to take a long time. The respondents most important protective group was their families. They had great concern for the well being of family members and their



safety both immediately after the storms and in between them when threatening weather appeared. The home itself and small items of sentimental value were discovered to be of extreme importance. When the home was intact, so was the family and when it was destroyed it threatened the integrity of the family. Often new homes, even if better than the old, did not have the same emotional value and significance as the old.

### Chapter 13: "There's A Fear You Can't Conquer"

The in-depth interviews suggest that there was much more emotional response to the two storms than appeared in the interview schedules. These emotional responses were, in many cases, persistent, and may have become permanent for some. The respondents were independent and self reliant and sought little help for things that were not severe injuries as they felt shame at having "nervous" problems. For the most part they were determined to remain in Lake View and overcome their emotional problems. They often repressed their fear when there were storm conditions and behaved in a restrained fashion to avoid transmitting fear to their children. People were highly sensitive, on a community basis, to weather conditions, especially clouds and weather reports. School officials were more tolerant of upsets and disruptions during cloudy conditions. Also, during cloudy conditions many in the area went to their storm shelters and invited neighbors to join them. Moore said (1958b, p. 272):

Commonly trips to the storm cellar were reported as pleasant occasions because of contact with friends and neighbors. In one home, it was reported that the cellar would accommodate 'about fifteen. In fact, we have had as many as twenty-seven in there at one time.... When we're down there we just talk and laugh. We have a club meeting down there.... Kiddoes named it our Tornado Club.'

### Chapter 14: "It Could Have Been Worse"

This chapter considers the subject's evaluation of their situation after the storms. They were ambivalent as they felt both desolated over the

loss of life and property and thankful for their survival and not having more serious injuries. Many found comfort in religion and viewed their survival as a matter of divine providence and miraculous protection.

The respondents were divided as to whether or not it was good therapy to discuss the storms. They had an in-group feeling and often felt more at ease and willing to discuss the storms with people who had shared the experience. Work was a major form of therapy for them, some of whom used it as a way to avoid thinking about the storms. An unexpected finding was an absence of panic in both Waco and San Angelo. When, just after the storms, the subjects immediate safety had been assured, their thoughts turned to others. Many of the respondents felt that the experience had increased the value of friends and brought people closer together. Considerable altruism, though not so-called in TOT, was found among the respondents.

Moore believed that the in-depth interviews were much more revealing than the interview schedules used in the study.

### Chapter 15: "Toward A Theory of Disaster"

This is a slightly changed reprint of Moore's article under the same name which appeared in the *American Sociological Review* (1956). Disasters upset the usual patterns of life and force people to deal with new tasks to survive. They are unpredictable while everyday life operates on the assumption that behaviors effective in the past change so slowly that patterns will not be seriously upset. Tornadoes are disasters because there is a lack of preparation for them, they are unexpected and there is a lack of adequate safeguards.

The first reaction is dazed bewilderment, disbelief, and a refusal to accept the fact of the disaster. People need time for a minimum of reorientation before going into action because, psychologically, the disaster has a narcotizing effect that prevents comprehension of it and, sociologically, persons are disoriented.

The dazed period is short for most and is followed by intense activity. It is an effort to gain reorganization through physical strength and vigor. The situation is still not seen clearly and rationally, but action is demanded as a way of gaining control. Leadership begins to function, and if responsible officials do not act, then others will. Old conflicts are



forgotten and everyone works for the common good with almost complete selflessness and great generosity.

After a few days, people begin to realize that the intense activity is not solving the problems. The result may be frustration, disorganization, and apathy. However, serious planning for reorganization begins to restore community authority and to protect community interests for the present and future. At this time too, people become more fully conscious of their loss, while they must deal with demands and requirements they do not understand and which seem heartless. They seek scapegoats, old conflicts return, and new ones develop. This "brick bat" stage is the beginning of a critical period of reorientation and what happens depends on the redefinition of the situation and plans developed to attain new goals. One possibility is to conclude that things cannot be restored to a desirable state and to move into one of several kinds of withdrawal. More common is to redefine goals in terms of what is believed to be attainable. Here leadership and the development of a team effort are important and there is likely to be considerable arbitration, compromise, and conciliation. The closer the plans are to the patterns that prevailed before the disaster, the more likely is the plan to meet with acceptance. When rehabilitation becomes institutionalized in this fashion, then the return to normal living comes through a slow and painful process.

#### WHY WAS TORNADOES OVER TEXAS IMPORTANT AT THE TIME

TOT was among the first and most important contributions to the modern study of disaster which began shortly after the end of the World War II. At the time Moore's research began there were thousands of accounts, in many literary and artistic forms, of disasters. But, the scientific literature was sparse (Baker 1962; Chapman 1962; Drabek 1986). The study of disaster was, as Moore noted, open, new, and had little upon which to build theory or propose hypotheses.

The importance of TOT lay less in the resolution of problems in the study of disaster than in the raising and presentation of many issues which soon became the objects of hypotheses and theoretical development. The significance of TOT was quickly recognized, and shortly after its publication it was reviewed in four mainline social science journals:

*The Annals, American Journal of Sociology, American Sociological Review, and Social Forces.*

Wallace (1958, pp. 169-170), described the contents of TOT and suggested that it had practical and theoretical uses. The Red Cross worker might gain a better understanding of the hostility toward that agency, the worker in race relations an appreciation of the differential impact of stressful events, and the Civil Defense worker a way to estimate the effectiveness of different activities in planning for emergencies. There was also rich empirical material for the theoretician who might wish to test hypotheses. Least useful in Wallace's view, was Chapter 15 "Toward A Theory of Disaster" which could have benefited from expansion and consideration of material published after its first appearance. "Nevertheless, the volume is an outstanding contribution to the literature of an area of very difficult empirical research, and deserves recognition as one of the most richly detailed and carefully considered studies available to the student of human behavior in extreme situations" (Wallace 1958, p. 170).

Deutscher (1959) wrote that TOT is "...possibly the most important document available to any who would plan realistically for disaster in cities." It showed the importance of communication and the ability of the American middle class to rebound and rebuild. Deutscher believed that the strongest part of the book was the indepth interviews. However, the "natural" experiment research opportunity provided by the tornadoes and the second storm in San Angelo was not fully exploited, and Moore was too apologetic for not using sophisticated statistical analysis.

In his review Otto N. Larsen (1959) gave considerable attention to the contents of TOT and the methodology used in gathering the data. He thought that the case material might be a useful source of hypotheses and that it was, in any case, "interesting journalism." He was also disappointed in the last chapter "Toward a Theory of Disaster." Larsen's review was less positive than the others. He concluded by saying that "While this exploration neither started nor ended very far down the road toward an integrated theory, the landmarks observed along the way may direct others to this demanding task" (Larsen 1959, p. 593).

TOT and *Community in Disaster* by William H. Form and Sigmund Nosow were jointly reviewed by Fred Charles Ikle in *Social Forces* (1959). He observed that before World War II little was known about



reactions to disasters and that some tragic mistakes could be traced to this lack of knowledge. But this ignorance had been reduced and both books reviewed made a contribution to the growing body of disaster literature. Especially interesting to Ikle, was Moore's material about the need for volunteer workers, the effect of the disasters on employment, local political behavior after the disasters, and communication during the recovery period. Like Deutscher, Ikle believed that Moore was unnecessarily apologetic about his use of statistical material. Also, he considered the review of the disaster literature to be inadequate.

TOT quickly became important, and has remained so until today. One way to demonstrate this is to discover the uses, through citations, made of TOT in review essays to determine its past and continuing influence. The following works were chosen: (1) George W. Baker and Dwight W. Chapman, editors, *Man and Society In Disaster* (1962), (2) Allen H. Barton, *Communities in Disaster: A Sociological Analysis of Collective Stress Situations* (1970), (3) Russell R. Dynes, *Organized Behavior in Disaster* (1970), (4) Dennis S. Mileti, Thomas E. Drabek, and J. Eugene Haas, *Human Systems in Extreme Environments: A Sociological Perspective* (1975), and (5) Thomas E. Drabek, *Human System Response to Disaster: An Inventory of Sociological Findings* (1986). Although this does not include all available review essays, it is believed that they present the main currents of thought in the study of disaster when they were published.

The citations were classified according to the typology of system responses to disaster presented in Mileti, Drabek, and Haas (1975), and in Drabek's (1986) review. In this scheme human systems are arranged from left to right in terms of increased structural complexity into the categories of: (1) the individual; (2) the group; (3) organizational; (4) the community; (5) society; and (6) international. There is also a temporal division: (1) preparedness (a. planning, b. warning); (2) response (a. pre-impact mobilization, b. post-impact emergency actions); (3) recovery (a. restoration--six months or less, b. reconstruction--six months or more); and (4) mitigation (a. hazard perceptions, b. adjustments).

In classifying Moore's work according to the typology of system responses to disaster the "Waco-San Angelo Disaster Study, First Annual Report: July, 1953-July, 1954" (1954) and "Waco-San Angelo Disaster Study, Report on Second Year's Work" (1955) are counted as

references to TOT as they are primary material from which the book was drawn. Also, the article "Toward A Theory of Disaster" (Moore, 1956) is counted the same way since it is the final chapter of TOT.

One of the earliest works devoted to the field of disaster as a whole was *Man and Society in Disaster* (Baker and Chapman 1962). The contributors wrote on a vast range of topics and, as shown below, TOT was mentioned 14 times and appeared in the individual, group, organizational, and society system levels and in the preparedness--warning, response--post-impact emergency actions, recovery--restoration (six months or less) and recovery--reconstruction (six months or more) disaster phases.

#### **Preparedness Warning**

**Group** (B&C-Janis:88-89) Prior experience may lead to formation of disaster subculture and have positive effect on response to warning (TOT: 271-271).

#### **Response--Post-Impact Emergency Actions**

**Group** (B&C-Barton:261) Without coordination groups are at cross purposes (TOT:14). (B&C-Barton:262) Military workers bought organization by incorporating civilians in their teams (TOT:14).

**Organizational** (B&C-Barton: 249-250) Uncoordinated requests for help can lead to wasteful convergence (TOT:13).

#### **Recovery--Restoration (6 months or less)**

**Individual** (B&C-Janis:87) Emotional disturbance most likely among those having had narrow escapes or victimized by disaster (TOT). (B&C-Friedsam:169) Disaster experience may lead to long term emotional disturbance (TOT). (B&C-Friedsam: 173-174) The aged had more loss than the younger especially items of symbolic value (TOT:252).

**Group** (B&C-Friedsam:170-171) Stress varies with family type. Aged show more stress.

**Organizational** (B&C-Thompson and Hawkes:294) Just after Red Cross & the Salvation Army generous (TOT:101). (B&C-Thompson and Hawkes:294) Later help from Red Cross depend on proof of need leading to unpopularity (TOT:180). (B&C-Thompson and Hawkes:296) Organizations working in disaster may reject parts of their authority (TOT:83-86).

#### **Recovery--Restoration (6 months or more)**

**Organizational** (B&C-Thompson and Hawkes:294) Moore gives description of activities of federal, state, and local government agencies, voluntary organizations, and private corporations (TOT).



**Society** (B&C-Thompson and Hawkes:295) When laws provided for federal, state, local participation there is confusion (TOT:Ch3).

In the case of Barton's *Communities in Disaster: A Sociological Analysis of Collective Stress Situations* (1970) there were 14 references to TOT as shown below. They fell into the individual, group, organizational, and community system levels and the preparedness -planning, response--post-impact emergency actions, recovery--reconstruction (six-months or more) disaster phases.

#### **Preparedness--Planning**

**Organization** (B:95) In Waco the electric company had a disaster plan which seemed effective (TOT:42). (B:96) Civil Defense planning in Waco was a failure (TOT).

#### **Response--Post-Impact Emergency Actions**

**Individual** (B:105) Role conflict on part of three city official in Waco (TOT). (B:152) Role conflict often resolved in favor of family role (TOT).

**Group** (B:190-191) Without coordination, group are at cross purposes. Teams formed before arrival were more effective (TOT:14).

**Organizational** (B:161) U.S. armed forces showed a community service orientation after tornadoes (TOT). (B:161) Profit organizations provided non-profit disaster service after tornadoes (TOT:14). (B:168-169) Uncoordinated requests for help can lead to wasteful convergence (TOT:13).

#### **Recovery--Restoration (6 months or less)**

**Individual** (B:298-301) Review of attitudes toward organizations active after tornado focus on hostility to Red Cross (TOT).

**Organizational** (B:295) Competition for social credit often appears among helping organizations (TOT).

**Community** (B:313) Architects' plan to rebuild Waco city center rejected (TOT:32). (B:314) Short-term disappearance of community conflict (TOT:32-34).

#### **Recovery--Restoration (6 months or more)**

**Community** (B:317) Relief funds in Waco were less important in long-term reconstruction (TOT:35-37). (B:292) "Old South" conservatives rejected extensive rebuilding--building codes not enforced (TOT:32).

*Organized Behavior in Disaster* (Dynes 1970) which was more focused and less general than the other books reviewed, had five references to TOT which, as shown below fell into the group, organizational, and com-

munity system levels and the response--post-impact emergency actions, recovery--restoration (six months or less), and recovery--reconstruction (six months or more) disaster phases.

#### **Response--Post-Impact Emergency Actions**

**Organizational** (Dy:44-45) Description of operation of Waco city government after tornado (1st and 2nd years reports).

#### **Recovery--Restoration (6 months or less)**

**Organizational** (Dy: 194-195) Just after emergency Red Cross is generous - later help depends on proof of need leading to unpopularity (TOT:179-180).

**Community** (Dy:102) Absence of conflict is replaced by scapegoating (TOT:315-316). (Dy:127) Content analysis of Waco newspaper showed: 1. focus on aid, 2. human interest, 3. later focus on rebuilding plans. Increased newspaper sales (TOT:194-205).

#### **Recovery--Restoration (6 months or more)**

**Group** (Dy:67) Poorly constructed homes more vulnerable leading to greater problems of moving for lower class residents. Mover families had: 1. lower incomes, 2. more members employed, 3. more children, 4. more disorganization than non-mover families. Mover families had 1. greater economic loss, 2. added expenses, 3. loss through interruption of employment and larger department, 5. more injuries (TOT:137).

Below we see that there were seventeen references to TOT in *Human Systems in Extreme Environments: A Sociological Perspective* (Mileti, Drabek, and Haas 1975). They fell into the individual, group, organizational, and community system levels and into the preparedness--warning, response--post-impact emergency actions, recovery--restoration (six months or less), and recovery--reconstruction (six months or more) disaster phases.

#### **Preparedness-Warning**

**Group** (MDH:41) Prior experience may lead to formation of disaster subculture and have positive effect on response to warning (ASR).

**Community** (MDH:55) Extreme outcome of prior experience is disaster subculture (ASR).

#### **Response--Post-Impact Emergency Actions**

**Individual** (MDH:59) Extreme events narcotize, prevent comprehension (ASR:734).



**Group** (MDH:72) Without coordination groups are at cross purpose and give rise to rumor (TOT:14).

**Organizational** (MDH:78) Welfare agencies applying universalistic standards may incur enmity if ignore local standards (ASR:736).

**Community** (MDH:87) Lack of central authority resulted in chaos in Waco (TOT:11).

#### Recovery-Restoration (6 months or less)

**Individual** (MDH:102) Military, state and city police, salvation army, church groups had positive response--Red Cross, local agencies and relief fund, federal, state and city government had negative response (TOT:100-101). (MDH:103) Speed of recovery influenced by past experience, emotional involvement and/or stability, definition of situation (ASR:736).

**Community** (MDH:119) Looting is rare in disasters (TOT). (MDH:121) Disaster leads to increased newspaper sales (TOT).

(MDH:121) Disaster leads to increased mail (TOT). (MDH:123) Short term disappearance of community conflict (TOT:33).

#### Recovery-Restoration (6 months or more)

**Group** (MDH:132) People financed most of their reconstruction (TOT:95). (MDH:133-134) MOver families had: 1. lower income, 2. more members employed, 3. more children, 4. more disorganization than nonmover families (TOT:137).

**Community** (MDH:140) Newspaper sales decline (TOT). (MDH:140) Unemployment declines (TOT:49). (MDH:140) Reconstructed houses had greater value (TOT:138). (MDH:141) Reconstruction much helped by voluntary funds and labor from outside community (TOT:44).

In Drabek's *Human System Responses to Disaster: An Inventory of Sociological Findings* (1986) there are six references to TOT. They fall into the organizational and community system levels and the preparedness--planning, response--pre-impact mobilization, the recovery--restoration (six months or less), and the mitigation--hazard perceptions disaster phases.

#### Preparedness-Planning

**Organizational** (D:41) Media organization and disaster subculture (ASR)

#### Preparedness-Warning

**Community** (D:125) Disaster subculture (ASR TOT).

#### Recovery-Restoration (6 months or more)

**Community** (D:224) Short term disappearance of community conflict (TOT:33). (D:292) Blame and scapegoating of Waco city government (TOT).

#### Mitigation-Hazard Perceptions

**Community** (D:339) Hazard perception and disaster subcultures (ASR). (D:340) Disaster subcultures as threat denial mechanisms (ASR).

With the exception of the International System Level and the mitigation--hazard perceptions and mitigation--adjustment disaster phases, TOT is cited in all other systems levels and disaster phases. The information presented in Figures 1-5 show that TOT has been a source of ideas and precedent for almost thirty years. A large number of perceptions, hypotheses, concepts, and theories of the middle range appear here, many of which are now so well established in the field that they are taken as "givens" rather than as problems -- "givens" to the extent that Moore's work as an original source may have dropped out of the citation lists of some contemporary writers.

## CONCLUSION

The publication of TOT was not the end of Moore's interest in disasters nor of his influence upon the field. He continued an active research program on disasters much of it in collaboration with other scholars some of whom are still active in the field. Among his writings are "Some Emotional Concomitants of Disaster" (Moore 1958a), "Reported Emotional Stress Following A Disaster" (Moore and Friedman 1959). *Before the Wind: A Study of Response to Hurricane Carla* (Moore et al. 1963). This work received 23 citations in the Mileti, Drabek, and Haas (1975) review and it was referred to 21 times in Drabek's (1986) review. He wrote, in collaboration with Frederick L. Bates, Jon P. Alston, Marie M. Fuller, Marvin V. Layman, Donald L. Mischer, and Meda Miller White *And The Winds Blew* (1964). He also prepared a TV documentary on the tornadoes which was shown by CBS.

Perhaps because it was late in his career that Moore became interested in disaster that he did not establish a theory group (Mullins 1973). Nor did he found a center for disaster research equivalent to the Dis-



aster Research Center at The University of Delaware or the Natural Hazards Research and Applications Information Center at The University of Colorado. Although Moore did direct one dissertation in disaster (Crawford 1957) he did not train many students who became active in the field.

Most of Moore's lasting influence comes from his writing, most notably TOT. The early book reviews give some idea of what a number of students of disaster considered important in TOT over almost 30 years. The information listed below each book review shows considerable agreement among them about what they considered significant in TOT. It is clear too that they emphasized different aspects of the work. It is interesting to speculate as to whether or not there might be ideas and concepts which were overlooked or not developed which might be useful today.

My rereading of TOT left me impressed by the self reliance of the victims, their determination to rebuild and rehabilitate on their own, and the reluctance of many officials to accept aid from outside sources such as the Federal Government. Today in the United States, the process of granting and receiving aid is well institutionalized. Yet it is also controversial in that some insist that victims, in the United States and other countries, do better if they depend mostly upon their own resources. A review of TOT and reexamination of the data of The Waco-San Angelo Disaster project on deposit in the University of Texas archives might allow a person interested in this problem an historical basis from which to trace shifts in expectations and acceptance of assistance and examine much more carefully the question of how much and what kind of assistance is most effective.

TOT was published early in the development of the scientific study of disaster. It quickly became an important part of the literature and it has maintained that position since. Nearly every area in the study of disaster has been influenced by it sometimes in ways that are no longer recognized. "Is the book worth reading today?" For those interested in the history of disaster studies, seeking to ground themselves in the area, looking for new insights, motivated by pure curiosity -- emphatically yes!

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